



## Installation and Maintenance Manual

### Air Hydro Converter

#### Series CCT160-400 to 800 -Q



Directive 97/23/EC Category I

## 1 Safety Instructions

- This manual contains essential information for the protection of users and others from possible injury and/or equipment damage.
- Read this manual before using the product, to ensure correct handling, and read the manuals of related apparatus before use.
- Keep this manual in a safe place for future reference.
- These instructions indicate the level of potential hazard by label of "DANGER", "WARNING" or "CAUTION", followed by important safety information which must be carefully followed.
- To ensure safety ISO4414: Pneumatic fluid power and JIS B 8370: Pneumatic system principles must be observed, along with other relevant safety practices.

<b>⚠ DANGER</b>	In extreme conditions, there is a possibility of serious injury or loss of life.
<b>⚠ WARNING</b>	If instructions are not followed there is a possibility of serious injury or loss of life.
<b>⚠ CAUTION</b>	If instructions are not followed there is a possibility of serious injury or loss of life.

### ⚠ WARNING

- The compatibility of pneumatic equipment is the responsibility of the person who designs the pneumatic system or decides its specifications.**

Since the products specified here are used in various operating conditions, their compatibility for the specific pneumatic system must be based on specifications or after analysis and/or tests to meet specific requirements.

- Only trained personnel should operate pneumatically operated machinery and equipment.**

Compressed air can be dangerous if an operator is unfamiliar with it. Assembly, handling or repair of pneumatic systems should be performed by trained and experienced personnel.

- Do not service machinery/equipment or attempt to remove components until safety is confirmed.**

- Inspection and maintenance of machinery/equipment should only be performed after confirmation of safe locked-out control positions.
- When equipment is to be removed, confirm the safety process as mentioned above. Switch off air and electrical supplies and exhaust all residual compressed air in the system.
- Before machinery/equipment is re-started, ensure all safety measures to prevent sudden movement of cylinders etc. (Supply air into the system gradually to create backpressure, i.e. incorporate a soft-start valve).

- Do not use the product outside of the specifications. Contact SMC if the product is to be used in any of the following conditions:**

- Conditions and environments beyond the given specifications, or if the product is to be used outdoors.
- Installations in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverage, recreation equipment, emergency stop circuits, press applications, or safety equipment.
- An application, which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.

## 1 Safety Instructions (continued)

### ⚠ CAUTION

- Do not expose the product to vibration and impact.
- Keep the specified ambient temperature range (5 to 50°C).
- Do not expose the product to heat radiation from a heat source located nearby.
- Perform maintenance and check at regular intervals.
- Perform a proper functionality check.
- Do not clean the product with chemicals such as benzene and thinner.

## 2 Specifications

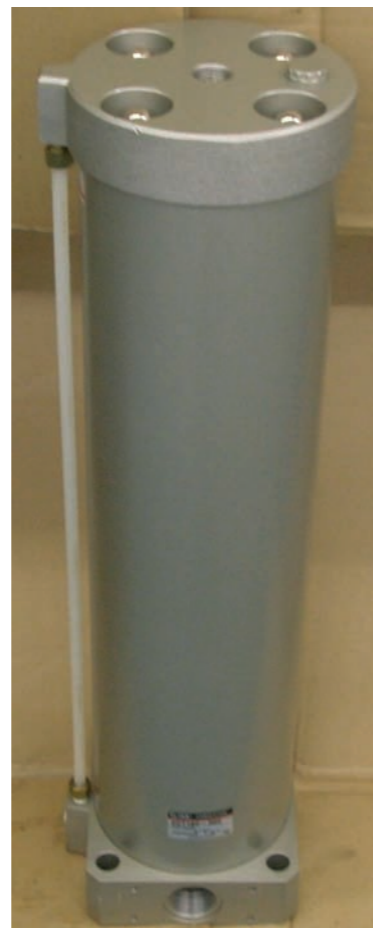
### 2.1 General Specifications

Bore	160mm
Operation pressure	0 to 0.7MPa
Proof pressure	1.05MPa
Ambient and fluid temperature	5 to 50°C
Working fluid	ISO VG32 Turbine oil

### 2.2 Piping (valve ports)

Air port; Rc3/4

Oil port; Rc1 1/4



## 3 Installation

### 3.1 Environment

#### ⚠ WARNING

- Do not install unless the safety instructions have been read and understood.

### 3.2 Environment

#### ⚠ WARNING

- Do not use in an environment where the product is directly exposed to corrosive gases, chemicals, salt water, water or steam.
- Do not use in an explosive atmosphere.
- The product should not be exposed to prolonged sunlight. Use a protective cover.
- Do not mount the product in a location where it is subject to strong vibrations and/or shocks. Check the product specifications for above ratings.
- Do not mount the product in a location where it is exposed to radiant heat.
- Do not use in atmosphere containing harmful gases such as chlorine, sulfurous acid and potassium bichromate to the gauge pipe.
- Avoid use near fire.
- Do not use in the clean room.

### 3.3 Piping

#### ⚠ CAUTION

- Before piping, make sure to clean up chips, cutting oil, dust, etc.
- When installing piping or fitting into a port, ensure that sealant material does not enter the port inside. When using seal tape, leave 1.5 to 2 threads exposed on the end of pipe/fitting.
- Tighten fittings according to appropriate tightening torque

Thread	Appropriate tightening torque (Nm)
Rc(PT) 3/4	28 to 30
Rc(PT) 1 1/4	40 to 42

- Be aware that the specified speed might not be attained if there is a restriction in the fittings or there are 90° bends
- Nylon tube (T series) is available as oil piping. Especially, white nylon tube (W) is recommended to make the air and foreign materials intruded into the oil visible
- Self-aligning fittings (H series) are available as oil fittings. Insert fittings (KF series) and one touch fittings (KQ series) are not acceptable.
- The oil piping should not have extreme differences in I.D. from each other and it also should not have protrusions and/or burrs etc. on the inner face
- No air should be sucked from the oil piping
- The hydraulic fluid may contain air bubbles due to cavitation. To remove the air bubbles from the piping, the following actions should be taken. (Cavitation is the generation of noise or vibration due to bursting air bubbles. The air bubbles are created from the air dissolved in the hydraulic fluid. The air is separated because the flowing hydraulic fluid causes a decrease of the partial pressure. The air bubbles burst when they reach the high-pressure area of the hydraulic fluid.)
  - Raise the piping between the cylinder and the air hydraulic converter.
  - Shorten the oil piping as much as possible.

### 3.4 Mounting

#### ⚠ CAUTION

- The air hydraulic converter must be installed vertically.
- The air hydraulic converter should be located above the cylinder as much as possible. If it is located below the cylinder, the air is allowed to stay inside the cylinder. In this case, the air needs to be released through the specific air release valve mounted on the oil piping.

## 3 Installation (continued)

### 3.5 Lubricating

#### ⚠ CAUTION

- Ensure that the used hydraulic fluid is clean and oil based (turbine oil with additive equivalent to ISO VG32 in viscosity). Non-flammable oil, machinery oil and spindle oil are not suitable
- In case the air hydraulic converter is mounted at a higher level than the cylinder.
  - Move the piston of the cylinder to the stroke end where the oil is supplied.
  - Open the air release valve of the cylinder (rotate 2 to 3 turns)
  - Remove the supply plug located at the upper side of the air hydraulic converter and supply the oil. Close the air release valve of the cylinder when the exhaust of the air together with the oil is stopped. Confirm that the amount of oil in the air hydraulic converter neither exceeds the upper limit seal (MAX) nor is lowered too much. In the latter case, oil needs to be added.
  - Check the amount of the oil and ensure no air is intruded into the oil. Then supply the oil for the opposite side. Move the piston to the opposite stroke end and repeat step 1) to 3) to supply the oil.
- In case the air hydraulic converter is mounted at a lower level than the cylinder.
 

Close the supply plug after the oil supply process is finished (step 1) to 3)). Feed the oil into the cylinder with pressurization at 0.05MPa on the air supply port of the air hydraulic converter. Close the air release valve of the cylinder when the exhaust of the air together with the oil is stopped. Compared to the case where the air hydraulic converter is located at a higher level than the cylinder, the air tends to residue inside the cylinder during operation of the cylinder and periodical air release is required.
- After the supply of oil is finished, tighten the supply plug with a torque from 2 to 3 Nm. Take care not to apply an excessive torque to the plug and damage it.
- Keep the oil level of the air hydraulic converter within the range between the two specified levels, MAX and MIN.

## 4 Circuit Symbols (ISO)



## 5 Maintenance

### ⚠ WARNING

- Not following proper procedures could cause the product to malfunction and could lead to damage to the equipment or machine.

- If handled improperly, compressed air can be dangerous. Assembly, handling and repair of pneumatic system should be performed by qualified personnel only.
- Drain: remove condensate from the filter bowl on a regular basis.
- Shut-down before maintenance: before performing any kind of maintenance make sure the supply pressure is shut off and all residual air pressure is released from the system to be worked on.
- Start-up after maintenance: apply operating pressure and power to the equipment and check for proper operation and possible air leaks. If operation is abnormal, verify the product set-up parameters.
- Do not make any modification to the product.
- Do not disassemble the product, unless required by installation or maintenance instructions.
- Do not disassemble the air hydraulic converter.

## 6 Limit of Use

### WARNING

- Do not exceed any of the specifications laid out in section 2 of this document or the specific product catalogue.
- A Lubricator is not required.
- Use of a mist separator is recommended to prevent drainage interfusion and extend the life of the operating oil.
- Use unpolluted turbine oil ISO VG32 with additive. Otherwise use petroleum based hydraulic or turbine oil with antifoaming additive.
- Do not use non-combustible hydraulic oil, machine oil and spindle oil.

## 7 Contacts

SMC Corporation    [www.smcworld.com](http://www.smcworld.com) (Global)    [www.smceu.com](http://www.smceu.com) (Europe)

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<b>AUSTRIA</b>	(43) 2262-62 280	<b>ITALY</b>	(39) 02-92711
<b>BELGIUM</b>	(32) 3-355 1464	<b>NETHERLANDS</b>	(31) 20-531 8888
<b>CZECH REP.</b>	(420) 5-414 24611	<b>NORWAY</b>	(47) 67 12 90 20
<b>DENMARK</b>	(45) 70 25 29 00	<b>POLAND</b>	(48) 22-548 50 85
<b>FINLAND</b>	(358) 207-513 513	<b>PORTUGAL</b>	(351) 2 610 89 22
<b>FRANCE</b>	(33) 1-64 76 1000	<b>SPAIN</b>	(34) 945-18 4100
<b>GERMANY</b>	(49) 6103 4020	<b>SWEDEN</b>	(46) 8-603 0700
<b>GREECE</b>	(30) 1- 342 6076	<b>SWITZERLAND</b>	(41) 52-396 3131
<b>HUNGARY</b>	(36) 1-371 1343	<b>TURKEY</b>	(90) 212 221 1512
<b>IRELAND</b>	(353) 1-403 9000	<b>UNITED KINGDOM</b>	(44) 1908-56 3888